

What is claimed is:

1. A radiation tolerant electrical component for providing controlled electrical response in radiation-intensive applications, the component comprising:

- an input line;
- an output line;
- a drive circuit;
- a non-hardened p-channel FET having a drain, a gate, and a source;
- an isolation circuit; and
- an output rectification circuit;

wherein:

- the input line is operably connected to the drive circuit;
- the drive circuit is operably connected to the gate;
- the source and gate are operably connected to the output rectification circuit;
- the output rectification circuit is operably connected to the output line;
- the isolation circuit is operably connected between the output line and the drive circuit to isolate the input line from the output line; and
- the drain is connected near ground.

2. The electrical component of claim 1 further comprising a de-coupling capacitor connected between the input line and ground.
3. The electrical component of claim 1 wherein the drive circuit further comprises:
  - a pulse width modulator operably connected to the input line;
  - a drive pulse transformer having a primary winding and a secondary winding, the primary winding connected to the pulse width modulator, the secondary winding connected to the gate and source.
4. The electrical component of claim 3 further comprising a primary blocking capacitor connected between the pulse width modulator and the primary winding.

5. The electrical component of claim 3 further comprising a secondary blocking capacitor connected between the gate and the secondary winding.
6. The electrical component of claim 3 further comprising a zener diode connected between the secondary winding and the gate.
7. The electrical component of claim 3 further comprising a bleeder resistor connected between the secondary winding and the gate.
8. The electrical component of claim 1 wherein the isolation circuit further comprises a reference and error amplifier connected between the output line and the drive circuit.
9. The electrical component of claim 8 wherein the isolation circuit further comprises a feedback isolator connected between the reference and error amplifier and the drive circuit.
10. The electrical component of claim 1 wherein the output rectification circuit further comprises a main flyback transformer having a flyback primary winding and a flyback secondary winding, the flyback primary winding connected to the input line and the source, the flyback secondary winding connected to the output line.
11. The electrical component of claim 10 wherein the output rectification circuit further comprises a rectifier diode connected between the flyback secondary winding and the output line.
12. The electrical component of claim 10 wherein the output rectification circuit further comprises an output peak filter capacitor connected across the flyback secondary winding.

13. The electrical component of claim 1 wherein the drive circuit further comprises:
  - a pulse width modulator operably connected to the input line;
  - a drive pulse transformer having a primary winding and a secondary winding;
  - an NPN bipolar transistor;
  - a PNP bipolar transistor;wherein:
  - the primary winding is operably connected to the pulse width modulator;
  - and,
  - the NPN transistor and the PNP transistor are connected in series across the secondary winding, between the secondary winding and the gate.
14. The electrical component of claim 13 further comprising a primary blocking capacitor connected to the primary winding.
15. The electrical component of claim 13 further comprising a secondary blocking capacitor connected to the secondary winding.
16. The electrical component of claim 13 further comprising a DC restorer diode connected across the secondary winding.
17. The electrical component of claim 13 further comprising a prevention diode connected across the secondary winding.
18. The electrical component of claim 13 further comprising an isolation resistor connected between the secondary winding and the NPN and PNP transistors.
19. The electrical component of claim 1 wherein the FET is a p-channel MOSFET.
20. The electrical component of claim 1 wherein the electrical component is a DC/DC converter.

21. The electrical component of claim 1 wherein the electrical component is a motor drive.
22. The electrical component of claim 1 wherein the electrical component is a solid state relay.
23. The electrical component of claim 1 wherein the electrical component is a power switch.